LONG-TERM OBJECTIVE: Restore midchannel islands and shoals in the Delta to a substantial fraction of their pre-settlement areas, or to a point where all at-risk species that depend on the habitats are no longer at risk.

SHORT-TERM OBJECTIVE: Develop and begin implementation of action plans for restoring large and significant examples of midchannel islands and shoals in the Delta.

RATIONALE: All major natural habitat types in the Delta, Suisun Bay, Suisun Marsh, and San Francisco Bay have been reduced to a small fraction of the area they once occupied, resulting in a large number of at-risk plant and animal species and an increased susceptibility of the remaining areas to irreversible degradation (e.g., invasion by non-native species). The reduction trend is continuing and will have to be reversed if self-sustaining examples of these habitats, and the diverse organisms they support, are to persist into the future. This reversal will require a large number of diverse and localized actions, from levee setbacks to land acquisition to better management of existing sites. The major habitat types to be restored include tidal shallow water habitat, freshwater emergent wetland, channel islands and associated habitats, tidal sloughs, nontidal freshwater emergent wetlands, seasonal upland wetlands, vernal pools and surrounding uplands, riparian forests and associated upland areas, perennial grassland, and inland dune scrub. In order to make restoration actions systematic and cost-effective, specific objectives need to be established for each of the habitat types, as well as subsets of them that have distinctive biological characteristics, and then priorities set within each objective for protection and restoration activities.

STAGE 1 EXPECTATIONS: A classification system for Delta, Suisun Bay, Suisun Marsh, and San Francisco Bay habitats that can be used as a basis for conservation actions will have been developed. Specific, numeric objectives should be formulated for each habitat type, with restoration objectives based on clearly stated conceptual models. Within and among habitat types, conservation and restoration activities should be prioritized. Work should begin on those projects given highest priority within a year of adoption of the strategic plan.

A second Strategic Objective is to rehabilitate natural processes to create and maintain complex channel morphology, in-channel islands, and shallow water habitat in the Delta and Suisun Marsh.

LONG-TERM OBJECTIVE: Have large expanses of shallow water habitat, both on the edges of channels and on small channel islands, maintained by natural processes.

SHORT-TERM OBJECTIVE: Set priorities for channels in terms their importance for shallow water habitat; develop and implement protection strategies for existing and restored shallow water habitat in those channels; investigate the value of shallow-water habitat in supporting and increasing abundances of desirable species.

RATIONALE: There is widespread agreement that more shallow water habitat needs to be created in the Delta and that existing shallow water habitat needs to be maintained. However, opinions differ on whether creating more habitat will actually increase abundance of desirable species. Ecosystem-based restoration is predicated on this assumption, but adaptive management demands that it be rigorously tested. Staged implementation will allow an increase in confidence in whether or not habitat restoration in the estuary will result in higher abundance of desirable species. Ultimately much of this shallow water habitat will be along Delta and Suisun Marsh channels (recreating some of the original channel-marsh system) or on small islands in the channels. The desirable physical and biotic characteristics of these habitats may be created artificially at first, but the expectation is that they will be maintained by natural processes (e.g., tidal flux, sediment inputs from upstream). This will require restrictions on human activities in these channels that have negative impacts on the habitats, such as boating at speeds that generate erosive wakes or channel dredging.

STAGE 1 EXPECTATIONS: Channels or channel reaches most suited for restoration and protection of shallow water habitats should be identified and given priorities for restoration activities. Detrimental human activities in these channels should be eliminated through a phased program associated with

restoration activities. Major studies of the use of shallow water habitats by native and non-native species should be undertaken to test the assumption that shallow water habitat is indeed the key to restoring many of the native species.

RESTORATION ACTIONS

The general restoration target for midchannel islands and shoals is to restore and maintain 50-200 acres of high quality midchannel islands and shoals.

The following actions would help to protect and restore channel islands and shoals:

- Implement restoration projects currently proposed in the Delta by resource and cooperating agencies.
- Develop and implement an inventory and assessment of the existing midchannel Delta islands. Use this information to develop long-term actions to protect and enhance the islands.
- Install structures, such as floating booms, to weaken the force of waves to reduce midchannel erosion in sensitive areas.
- Reduce boat traffic near high quality midchannel islands.

Mid-channel islands are important habitat, but restoration cost will be a consideration in designing and implementing restoration actions. To most effectively link the restoration of mid-channel islands with adaptive management, a Delta-wide understanding of the value of natural flows, water velocities, and sediment transport processes need to be well understood. This can be facilitated by developing conceptual models based on our present understanding of the processes that create, maintain, or erode channel islands. Locating areas where sediment accretion is occurring naturally is vital to restoring channel islands. Projects in these areas may be cost-effective.

MSCS CONSERVATION MEASURES

The Multi-Species Conservation Strategy (2000) has developed draft recommendations identifying the types of potential conservation measures to protect mid-channel island and shoal dependent species.

- Restore and enhance delta smelt habitat to provide suitable water quality (i.e., low concentrations of pollutants) and substrates for egg attachment (submerged tree roots, branches, rock, and emergent vegetation) to important spawning areas.
- To the extent consistent with CALFED objectives, protect spawning areas by providing suitable water quality (i.e., low concentrations of pollutants) and substrates for egg attachment (submerged tree roots, branches, rock, and emergent vegetation).
- To the extent consistent with CALFED objectives, incorporate sufficient edge habitat to support Mason's lilaeopsis in levee setback and channel island habitat restoration designs.

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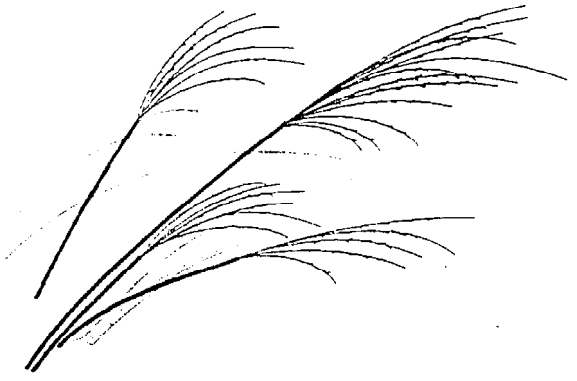
◆ Saline Emergent Wetland



INTRODUCTION

Saline emergent wetland habitats are located on the western edge of the Delta and in Suisun Marsh on the Bay. Saline emergent wetland habitats, including brackish and saline wetlands, are important habitats for fish and wildlife that are dependent on marshes and tidal shallows. This designation is similar to the Goals Project (1999) descriptions of tidal marsh which includes tidal salt marsh and tidal brackish marsh.

The loss or degradation of historic saline emergent wetlands has substantially reduced the habitat area available for associated or dependent fish and wildlife species. Several plant and animal species closely associated with tidal saline emergent wetlands have been listed as endangered under the State and federal Endangered Species Acts, primarily as a result of the extensive loss of this habitat type. Major factors that limit this resource's contributions to the health of the Delta are related to harmful effects of saline emergent wetlands conversion for agricultural, industrial, and urban uses.

SALINE EMERGENT WETLAND HABITAT is defined in the MSCS as saline emergent habitat. It includes portions of San Francisco, San Pablo, and Suisun bays and the Delta that support emergent wetland plant species that are tolerant of saline or brackish conditions within the intertidal zone or on lands that historically were subject to tidal exchange (i.e., diked wetlands) (Multi-Species Conservation Strategy 2000).

RESOURCE DESCRIPTION

Saline emergent wetlands were once continuous from San Francisco Bay into the western Delta. Saline emergent habitat also is found in low-elevation areas of the Central Valley where salts have accumulated and groundwater is near the surface. Most remnant tidal saline emergent wetlands are narrow bands along the margins of San Pablo Bay and Suisun Marsh and Bay. Extensive relict tidal marshes are associated with Cutoff Slough and eastern Hill Slough flank the Potrero Hills in the north-central Suisun Marsh and are especially unique in that there is a wetland continuum from tidal sloughs through low, middle, and high marsh zones and into adjacent uplands which are rich with associated vernal pools.

Land use changes over the past century have reduced the amount of saline emergent wetland habitat and fragmented what was once nearly contiguous habitat. In particular, diking of historic wetlands has substantially reduced the amount of tidally influenced saline emergent wetlands. Large areas of nontidal wetlands that were created largely by diking for reclamation are present in the Suisun Marsh and Bay areas.

Saltwater flowing into the Delta was reduced by water management in California's Central Valley. Before the development of California's reservoir system, saltwater intruded far into the upper Delta during summer months. This saltwater intrusion created a seasonally wide range of salinity over a large portion of the estuary. Reservoir operations and other water management practices have reduced saltwater intrusion into the Delta by retaining water during winter and releasing water during summer. Consequently, the area that can support brackish wetlands has been reduced, and the area that can support fresh emergent wetlands has increased. Complex water control systems are now required in Suisun Marsh to preserve the largest single area of saline emergent wetland habitat in California.

Saline emergent wetland area and quality have decreased because of historical conversion to other uses, and reduced land subject to tidal flooding. This habitat has a reduced potential to maintain populations of many native plant and wildlife species.

Many plant species that depend on saline emergent wetlands, including Ferris's milkvetch, soft bird's beak, palmate bird's beak, narrow-leaf gumplant, Suisun Marsh thistle, heartscale, San Joaquin spearscale, crownscale, brittlescale, Delta button celery, and hairy bird's beak, have been given special status because of their reduced populations.

More than 25 species of birds and mammals use saline emergent wetlands in the estuary. Populations of some wildlife species that are heavily dependent on saline emergent wetlands, such as the endangered clapper rail and salt marsh harvest mouse, have been substantially reduced in the Bay-Delta and designated as special-status species. A few wetland-associated species, such as waterfowl and egrets, have adapted to foraging on some types of croplands.

Saline emergent wetland also serves as an important transitional habitat between open water and uplands. Wildlife species that use tidally influenced areas, such as the salt marsh harvest mouse, have adapted to moving during high tides to seasonal wetlands and uplands above the saline emergent wetlands. Loss of adjacent seasonal wetlands and uplands has prevented species associated with these intertidal habitat areas from finding refuge in the higher tidal zone elevations.

Since the turn of the century, an estimated 70,000 acres of saline emergent wetland have been lost in the Suisun Marsh and Bay and the west Delta. The primary factor causing this loss has been wetland conversion to agricultural and other land uses.

Diking has isolated most of the remaining saline emergent wetlands from tidal flows. Loss of tidal flows into and out of the wetlands has substantially reduced the exchange of nutrients between these wetlands and tidal aquatic communities. Wetlands receiving tidal flows are highly productive, supporting large numbers of important foodweb microorganisms, and maintaining rearing areas for many fish species. Consequently, loss of tidal exchange has greatly reduced the contribution of saline emergent wetlands to the Bay-Delta aquatic ecosystem.

The loss of tidal exchange can also affect the biochemical balance in the soil-water interface. Excessive accumulation of salt in some soils has created conditions unsuitable for plant growth. Agricultural and other land uses have allowed undesirable non-native plant species to become established in remaining wetlands. Non-native plants compete with native plants and change the structure and diversity of the saline emergent plant community from historical conditions.

Tidal exchange is the primary process that supports healthy saline emergent wetlands in the Bay-Delta. Tides flush the wetland system, replacing nutrients and balancing salinity concentrations. Changes in the tidal flux and the accompanying daily and seasonal salinity changes are critical to habitat functioning. Saline emergent wetlands are recognized for their high productivity, which results from the complex interactions of dissolved nutrients with the saline or brackish water. The process of mixing estuarine freshwater with tide-driven saltwater is critical for the biochemical transformations (i.e., carbon and nitrogen cycles) which support the entire estuarine ecosystem.

Human-made stressors negatively affect the health of saline emergent wetlands. Controls placed on seasonal inflow of fresh water to the Delta effect the salinity gradient of the estuary. Land use practices, primarily those associated with agriculture, result in the establishment of weedy plants that displace native, saline-adapted plant species. An associated stressor is the loss of adjacent native upland habitats, which are used by some wildlife species as a temporary refuge when escaping high tides. Collectively, these stressors have substantially reduced the habitat quality of remaining saline emergent wetlands. The combined effect of these actions could eventually be the elimination of much of the remaining habitat.

VISION

The vision is to increase the area and protect the quality of existing saline emergent wetlands from degradation or loss to assist in the recovery of special-status plant, fish, and wildlife populations.

Restoration will provide high-quality habitat for other fish and wildlife dependent on the Bay-Delta. Restoration of saline emergent wetlands would focus on protecting and improving important existing wetlands and restoring wetlands in the Suisun Marsh/North San Francisco Bay Ecological Management Zone. Restoring saline emergent

wetland is dependent on restoring tidal flows, establishing and maintaining healthy estuarine salinity gradients and reestablishing elevation gradients from open water to uplands.

Enhancing and increasing saline emergent wetland habitat would also help to increase water quality. Areas restored to tidal flow will contribute to the aquatic foodweb of the Bay-Delta and provide fish rearing habitats. Restoring saline emergent wetland would improve the ecological value of adjacent associated habitats, including tidal aquatic habitats, and will provide an important transitional zone between open water and uplands.

Other habitat restoration efforts will be directed toward reestablishing native plant species, controlling competitive weedy plants, increasing the quality of adjacent upland habitats to provide refuge for wildlife during high tides, and modifying land use practices that are incompatible with maintaining healthy wetlands. Restoring saline emergent wetlands would be coordinated with restoration of other habitats to increase overall habitat values. For example, saline emergent wetland greatly increases wildlife habitat quality of deep and shallow open-water areas and adjacent grasslands.

These protection and restoration needs could be met by establishing cooperative efforts between government and private agencies. This effort would coordinate implementation of existing restoration strategies and plans; develop and implement alternative land management practices on public lands to improve wetland habitat quality or promote habitat recovery; provide incentives to private landowners to implement desirable land use practices; establish additional incentive programs to encourage landowners to create and maintain saline emergent wetlands; and protect existing habitat areas from future degradation through acquisition of conservation easements or purchase from willing sellers.

LINK TO MSCS EVALUATED SPECIES

The MSCS has identified the following species as potentially benefitting from restoration of saline emergent wetland habitat in the Bay-Delta system:

MSCS SPECIES INCLUDED IN THE ERPP

- salt marsh harvest mouse
- California clapper rail
- steelhead
- delta smelt
- winter-run chinook salmon
- Mason's lilaeopsis
- Sacramento splittail
- fall-tun chinook salmon
- spring-run chinook salmon
- Suisun ornate shrew
- saltmarsh common yellowthroat
- San Pablo song sparrow
- Suisun song sparrow
- Sacramento perch
- San Pablo California vole
- longfin smelt
- delta tule pea
- soft bird's-beak
- Suisun thistle

OTHER SPECIES EVALUATED IN THE MSCS

- American peregrine falcon
- California black rail
- white-tailed kite
- Aleutian Canada goose
- tidewater goby
- black tern
- California seablite
- short-eared owl
- California gull
- long-billed curlew
- norther harrier
- Point Reyes bird's-beak
- Marin knotweed.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

The use of saline emergent wetland habitat here is similar to the Goals Project (1999) designation of tidal salt marsh and tidal brackish marsh, and Cowardin's (1979) emergent wetland classification.

Efforts to restore fresh emergent wetland habitat would involve cooperation with other wetland restoration and management programs. These include:

- Suisun Marsh Preservation Agreement,
- Natural Resources Conservation Service's Wetland Reserve Program,

- Wildlife Conservation Board's Inland Wetlands Conservation Program,
- restoration programs administered by Ducks Unlimited and the California Waterfowl Association,
- ongoing management of State and federal wildlife refuges and private duck clubs,
- and the San Francisco Bay Area Wetlands Ecosystem Goals Project.

Proposed ERPP targets are intended to be consistent with wetland habitat goals identified by the San Francisco Bay Area Wetlands Ecosystem Goals Project. Agencies or organizations with responsibility or authority for restoring wetland and aquatic habitats will be asked to cooperate. These include:

- U.S. Bureau of Reclamation,
- California Department of Water Resources,
- California Department of Fish and Game,
- U.S. Fish and Wildlife Service,
- California Coastal Conservancy,
- San Francisco Bay Area Conservancy Program,
- San Francisco Bay Conservation and Development Commission,
- San Francisco Bay Joint Venture,
- San Francisco Bay Regional Water Quality Control Board,
- and the Delta Protection Commission,

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Saline emergent wetlands are linked to other ecological elements in the Bay. Tidal exchange is an important ecological function that restores the proper salinity and nutrient balance and mixed fresh and estuarine waters.

Saline emergent wetlands are closely linked to open water areas and upland habitats. The value of each habitat is increase by the presence and quality of the adjacent types of habitats. A variety of aquatic and terrestrial fish, wildlife and plant communities depend on healthy saline emergent wetlands. These include numerous plant species and the salt marsh harvest mouse.

Saline emergent wetland are impaired by reduced seasonal inflow of fresh water, land use and loss of upland habitat, and introduction and proliferation of invasive salt marsh plant species.

OBJECTIVE, TARGETS, ACTIONS, AND MEASURES

The Strategic Objective is to restore large expanses of all major habitat types, and sufficient connectivity among habitats, in the Delta, Suisun Bay, Suisun Marsh, and San Francisco Bay to support recovery and restoration of native species and biotic communities and rehabilitation of ecological processes.

LONG-TERM OBJECTIVE: Restore saline emergent wetlands in the Delta, Suisun Bay, Suisun Marsh, and San Francisco Bay to a substantial fraction of their presettlement areas, or to a point where all at-risk species that depend on the habitats are no longer at risk.

SHORT-TERM OBJECTIVE: Inventory and prioritize for restoration diked former tidal marsh sites, develop techniques for restoration through implementation of pilot restoration projects, and begin implementation of large-scale manipulations of high priority areas, especially in the Suisun Marsh.

RATIONALE: Tidal wetlands are a diverse group of habitats included under Objective 1 and 2 in this series. However, they merit additional attention beyond those objectives because their restoration is urgently needed for the benefit of many species. They also represent, by acreage, some of the largest restoration projects that are likely to be attempted in the system. Restoration of tidal marshes in the Suisun Marsh and San Pablo Bay in particular will require innovation and a concerted and collaborative effort with existing landowners, because restoration of tidal action to one parcel may result in special levee rehabilitation needs on adjacent lands and because successful restoration of natural marsh building processes requires careful consideration of any potential site's elevation, topography, and geomorphology. Therefore, restoration will initially

require pilot projects to ensure the success of larger scale tidal restoration projects.

STAGE 1 EXPECTATIONS: Ongoing efforts to restore large expanses of tidal marsh should continue and experimental pilot projects to restore tidal marshes to areas in the Suisun Marsh and San Pablo Bay should be undertaken.

RESTORATION ACTIONS

The general target for saline emergent wetland is to restore 7,000 to 11,000 acres in the Suisun Marsh/North San Francisco Bay Ecological Management Zone.

The following actions would help achieve saline emergent wetlands restoration:

- restore tidal flows to diked wetlands by breaching dikes in suitable areas;
- establish desirable estuarine salinity gradients by managing water diversions and water releases from upstream reservoirs to control seasonal freshwater inflows to the Delta;
- balance seasonal flows from reservoirs for fisheries, water conveyance, flood control, and the needs of other habitats; and
- restore a more natural elevation gradient in wetlands to allow a greater diversity of native saline plant species, including special-status species, that are adapted to different elevations and provide a broader range of habitats for wildlife.

MSCS CONSERVATION MEASURES

The following conservation measures were included in the Multi-Species Conservation Strategy (2000) to provide additional detail to ERP actions to restore saline emergent wetlands that would help achieve species habitat or population targets.

- The geographic priorities for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for the Suisun ornate shrew should be: 1) western Suisun Marsh, 2) Napa Marshes and eastern Suisun Marsh, and 3) Sonoma Marshes and Highway 37 marshes west of Sonoma Creek.
- The geographic priorities for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for the San Pablo song sparrow should be: 1) Gallinas/Ignacio marshes and Napa marshes, 2) Sonoma Marshes, Petaluma Marshes, and Highway 37 marshes west of Sonoma Creek, 3) Point Pinole marshes, and 4) Highway 37 marshes east of Sonoma Creek.
- The geographic priorities for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for the Suisun song sparrow should be: 1) western Suisun Marsh, 2) eastern Suisun Marsh, and 3) Contra Costa County shoreline.
- The geographic priorities for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for the salt marsh harvest mouse should be: 1) western Suisun Marsh, 2) Gallinas/Ignacio Marshes, Napa Marshes and eastern Suisun Marsh, and 3) Sonoma Marshes, Petaluma Marshes and Highway 37 marshes west of Sonoma Creek, 40 Point Pinole Marshes, 5) Highway 37 marshes east of Sonoma Creek, and 6) the Contra Costa County shoreline.
- The geographic priorities for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for the California clapper rail should be: 1) Gallinas/Ignacio marshes and Napa Marshes, 2) Sonoma Marshes, Petaluma Marshes, and Highway 37 marshes west of Sonoma Creek, 3) Point Pinole Marshes, 4) Highway 37 marshes west of Sonoma Creek, and 5) the Contra Costa County shoreline.
- The geographic priorities for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for the California black rail should be: 1) western Suisun Marshes, 2) Gallinas/Ignacio marshes, Napa Marshes and eastern Suisun Marshes, 3) Sonoma Marshes, Petaluma Marshes, and Highway 37 marshes west of Sonoma Creek, 4) Point Pinole Marshes, 5) Highway 37 marshes west of Sonoma Creek, and 6) the Contra Costa County shoreline.

- The geographic priorities for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for the saltmarsh common yellowthroat should be: 1) Gallinas/Ignacio marshes and Napa Marshes, 2) Sonoma Marshes, Petaluma Marshes, and Highway 37 marshes west of Sonoma Creek, 3) Point Pinole Marshes, 4) Highway 37 marshes west of Sonoma Creek, and 5) the Contra Costa County shoreline.

- The geographic areas for implementing actions to protect, enhance, and restore saline emergent wetlands and associated habitats for Suisun song sparrow, San Pablo song sparrow, Suisun ornate shrew, San Pablo California vole, California clapper rail, California black rail, salt marsh harvest mouse, saltmarsh common yellowthroat include western Suisun Marshes, Gallinas/Ignacio marshes, Napa Marshes eastern Suisun Marshes, Sonoma Marshes, Petaluma Marshes, Highway 37 marshes west of Sonoma Creek, Point Pinole Marshes, Highway 37 marshes west of Sonoma Creek, and the Contra Costa County shoreline.

- Coordinate protection, enhancement, and restoration of saltmarsh and associated habitats with other federal, state, and regional programs (e.g., the San Francisco Bay Area Wetlands Ecosystem Goals Project, and USFWS species recovery plans) that could affect management of current and historic habitat use areas to avoid potential conflicts among management objectives and identify opportunities for achieving multiple management objectives.

- Initial Suisun ornate shrew recovery efforts should be directed to locations where there are immediate opportunities for protection, enhancement, and restoration of suitable habitat.

- To the extent practicable, direct ERP salt marsh enhancement efforts towards existing degraded marshes that are of sufficient size and configuration to develop fourth order tidal channels (marshes would likely need to be at least 1,000 acres in size).

- Restore wetland and perennial grassland habitats adjacent to emergent wetland habitats to create a buffer of natural habitat to protect populations of covered species form potential adverse affects that could be associated with future changes in land use on nearby lands and to provide habitat suitable for the natural expansion of populations.

- To the extent practicable, design dikes constructed in enhanced and restored saline emergent wetlands to provide optimal wetland to upland transitional habitat.

- Design salt marsh enhancements and restorations to provide low-angle upland slopes at the upper edge of marshes to provide for the establishment of suitable and sufficient wetland to upland transition habitat. To the extent feasible, transition habitat zones should be at least 0.25 miles in width.

- Identify and implement feasible methods for controlling invasive non-native marsh plants.

- Direct salt marsh habitat enhancements and restoration towards increasing habitat connectivity among existing and restored tidal marshes.

- To the extent practicable, direct ERP restorations to improve tidal circulation to diked wetlands that currently sustain partial tidal exchange.

- To the extent practicable, acquire, restore, and manage historic tidal salt marshes and surrounding land occupied by the San Pablo California vole along the west side of Point Pinole to tidal marsh with sufficient wetland to upland transition and adjacent upland habitat to improve habitat conditions for the San Pablo California vole.

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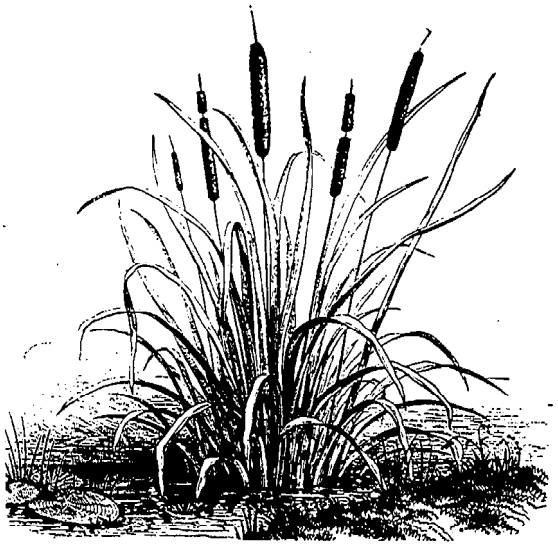
◆ FRESH EMERGENT WETLAND



INTRODUCTION

Most fresh emergent wetlands in the Delta occur as narrow, fragmented bands. These fragmented wetlands appear along island levees, channel islands, shorelines and levee blowout ponds. Small areas of nontidal fresh emergent wetlands exist on Delta islands. These Delta island wetlands are primarily associated with agricultural infrastructure (e.g., drainage ditches), levee blowout ponds, and areas managed for wetlands (e.g., duck clubs). Fresh emergent wetlands also include natural non-tidal wetlands outside of the Delta and found throughout the ERP focus area.

Tidal and nontidal fresh emergent wetland habitats are important habitat areas for fish and wildlife dependent on marshes and tidal shallows and support several special-status plant species. The loss or degradation of historic fresh emergent wetlands has substantially reduced the habitat area available for associated fish and wildlife species. Major factors that limit this resource's contribution to the health of the Bay-Delta are related to adverse effects of wetlands conversion to agricultural, industrial, and urban uses.

RESOURCE DESCRIPTION

Over the past 150 years, more than 300,000 acres of fresh emergent wetlands have been lost in the Sacramento-San Joaquin Delta Ecological Management Zone. Less than 15,000 acres remain.

Prior to the mid-1800s, extensive areas of fresh emergent habitat occurred throughout the Central Valley, particularly in the Delta. A complex network of rivers, sloughs, and channels connected low islands and basins that supported a diverse and dense variety of freshwater emergent vegetation. This freshwater emergent vegetation supported a diversity of fish and wildlife species and ecological functions.

Fresh Emergent Wetland Habitat is included in the MSCS description of tidal freshwater emergent habitat and nontidal freshwater permanent emergent habitat. The MSCS tidal freshwater emergent habitat includes portions of the intertidal zones of the Delta that support emergent wetland plans species that are not tolerant of saline or brackish conditions. Tidal freshwater emergent habitat includes portions of the ERP delta slough, midchannel island, and fresh emergent wetland habitats. The MSCS nontidal freshwater permanent emergent habitat included permanent (natural and managed) wetlands, including meadows, dominated by wetland plant species that are not tolerant of saline or brackish conditions. Nontidal freshwater permanent emergent habitat included portions of the ERP fresh emergent wetland habitat. (Multi-Species Conservation Strategy 2000).

Vast areas of the Sacramento-San Joaquin Valley were commonly flooded in winter by a slow-moving blanket of silt-laden water. Flood control activities and land settlements in the late 1800s and early 1900s led to the development of leveed Delta islands. Levees and other land uses led to the loss of fresh emergent wetlands in the Delta. Loss of wetlands has substantially reduced habitat for wetland wildlife species in the Bay-Delta system. Fresh emergent wetland losses have also substantially reduced the area available for the biological conversion of nutrients in the Delta. The Delta contains insufficient wetland area to provide adequate levels of nutrient transformation, which results in lower quality water in San Francisco Bay.